

THE NORTH AMERICAN SPECIES OF SYNTOMOSPHYRUM

(HYMENOPTERA, CHALCIDOIDEA)

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The eulophid genus *Syntomosphyrum* Foerster was originally described from Germany with a single included species.¹ This generic name first appeared in the North American literature in 1894, when Ashmead described two species, one from the island of St. Vincent² and the other from the State of Virginia.³ In 1897 Howard⁴ transferred to *Syntomosphyrum* a species previously described by Riley in the genus *Cirrospilus*. He pointed out that the species from Virginia that Ashmead had described in *Syntomosphyrum* in 1894 was a synonym of it.

In his classification of the chalcid flies, Ashmead⁵ keyed out the genus *Syntomosphyrum*, but used characters which do not at all agree with those given in the original description of the genus. As characterized in Ashmead's classification the genus actually would be the same as *Tetrastichus* Walker. Kurdjumov⁶ considered *Syntomosphyrum* to be a synonym of either *Tetrastichus* or *Geniocerus* Ratzeburg. Waterston⁷ was of the opinion that *Syntomosphyrum* was a distinct genus, and he pointed out that it had been wrongly characterized in Ashmead's classification. A number of foreign species have been described in *Syntomosphyrum* in the last 50 years, but no North American species were added to the genus until 1951, when three species, described in other genera, were transferred to it.⁸

When I revised the North American species of *Tetrastichus* in 1943,⁹ I concluded that *Tetrastichus* and *Geniocerus* should be combined but that *Syntomosphyrum* was a distinct genus. At that time I excluded from consideration in *Tetrastichus* the three species which have now been transferred to *Syntomosphyrum*. Recently I received for identification a long series of a new species of *Syntomosphyrum*, so that it seems desirable to describe this new form and to key out and characterize the other North American species, and to redefine the genus.

¹Naturh. Ver. Preuss. Rheinlande Verh. 35:60, 1878.

²Linn. Soc. London Jour., Zool. 25:181, 1894.

³Amer. Ent. Soc. Trans. 21:343, 1894.

⁴U. S. Dept. Agr., Div. Ent. Tech. Ser. 5:38, 1897.

⁵Carnegie Mus. Mem. 1(4):225-551, 1904.

⁶Russ. Ent. Obozr. (Rev. Russe d'Ent.) 13:242, 1913.

⁷Bul. Ent. Res. 5:364, 1915.

⁸Muesebeck and others, U. S. Dept. Agr. Monog. 2, p. 451, 1951.

⁹U. S. Natl. Mus. Proc. 93:505-608, 1943.

It has unfortunately not been possible for me to locate authentically determined specimens of the type species of *Syntomosphyrum*. Kurdjumov stated in 1913 that the species was missing from the Foerster collection in Vienna at that time. Mr. Gahan did not locate it when he studied the Foerster collection in Vienna in 1927, and when I visited the Zoological Museum in Berlin in 1945, Dr. Bischoff informed me that there were no Foerster types of chalcids there. I know of no authentic material of the species in any other museum. It has, accordingly, been necessary for me to rely on Foerster's description of the genus and on his characterization of the type species in forming my concept of this genus.

Genus **Syntomosphyrum** Foerster

Syntomosphyrum Foerster, 1878. Naturh. Ver. Preuss. Rheinlande Verh. 35:60.

Type: *Syntomosphyrum fulvipes* Foerster. Orig. desig.

Tetrastichopsis Girault, 1916. U. S. Natl. Mus. Proc. 51:132.

Type: *Tetrastichopsis prionomeri* Girault. Orig. desig.

The following combination of characters will serve to distinguish the members of the genus *Syntomosphyrum* from all other members of the subfamily Tetrastichinae of the family Eulophidae:

Antennae inserted at or slightly below center of frons, at level of ventral margins of compound eyes; eyes hairy; an obscure, triangular fracture present in scrobe cavity just ventral to anterior ocellus, and a median furrow in scrobe cavity extending from this triangle to level of antennal bases; antennal scape relatively short, never exceeding level of vertex, usually not exceeding level of ventral margin of anterior ocellus; pedicel elongate, always longer than first funicle segment; female with 3 funicle segments, male with 4, club with 3 clearly defined segments in both sexes; width of malar space three-fifths or more as great as height of compound eye. Mesoscutum with median, longitudinal furrow virtually or quite obliterated; mesoscutellum with longitudinal, sublateral carinae faintly visible at anterior margin of this sclerite, completely obliterated more posteriorly; submarginal vein of fore wing bearing 2 to 6 dorsal bristles, marginal vein thickened at base and length of this vein two and one-half or more times as great as length of stigmal vein; hind wing with 3 hamuli. Gaster oval in dorsal outline, flattened, always wider than thorax and usually shorter than thorax and propodeum combined, sometimes the same length; apex of ovipositor at most protruding only slightly past apex of gaster, usually not reaching its apex.

KEY TO NEARCTIC SPECIES OF SYNTOMOSPHYRUM

- 1. Hind coxae white..... **ischnopterae** (Girault)
- Hind coxae mostly or entirely brown or black..... 2

2. Propodeum shagreened, median carina well developed.....
 **esurus** (Riley)
 Propodeum smooth, median carina vague or wanting 3
3. Mesal length of propodeum one and one-half times as great as
 length of postscutellum **philodromi** (Gahan)
 Mesal lengths of propodeum and postscutellum equal 4
4. Antennal scape mostly brown in both sexes; body with faint,
 iridescent blue luster; marginal vein two and one-half times
 as long as stigmal **prionomeri** (Girault)
 Female with entire antennal scape light yellow or white, male
 scape light yellow or white with anterior, foliaceous lamina
 darkened; body very dark brown to black, without metallic
 luster; marginal vein four times as long as stigmal
 **blattae**, new species

Syntomosphyrum ischnopterae (Girault)

Epomphaloides ischnopterae Girault, 1917. Ent. News 28:257.

Syntomosphyrum ischnopterae (Girault) Peck in Muesebeck and others,
 1951. U. S. Dept. Agr. Monog. 2, p. 451.

Female.—Length of body 1.3-1.6 mm. Head and body very dark brown, antennal scape and pedicel yellow, funicle and club brown; legs including coxae usually entirely light yellow or white, hind femora sometimes partly brown, hind tibiae often slightly darkened.

Apex of antennal scape reaching level of ventral margin of anterior ocellus; relative lengths of parts of antenna—scape, 7; pedicel, 3.5; first funicle segment, 3; second, 3; third, 3; club, 6. Mesoscutum bearing one row of bristles at each lateral margin; marginal vein of fore wing 4 times as long as stigmal; submarginal vein bearing 4-5 dorsal bristles; median length of mesoscutellum 3 times as great as length of postscutellum and twice as great as length of propodeum. Surface of propodeum smooth, median carina weak; gaster as long as thorax and propodeum combined; apex of ovipositor just reaching apex of abdomen.

Male.—Length of body 1.2 mm. Antennal scape bearing a darkened, anterior carina on apical half; relative lengths of parts of antenna—scape, 6.5; pedicel, 3.5; first funicle segment, 2; second, 3.5; third, 3.5; fourth, 3.5; club, 7; funicle segments enlarged near bases and bearing conspicuously long bristles; gaster slightly shorter than alitrunk.

Type locality.—Plummer's Island, Md.

Types.—U. S. N. M. no. 20932.

Distribution.—District of Columbia; Maryland.

Host.—Oothecae of woods roach, *Ischnoptera* sp.

Syntomosphyrum esurus (Riley)

Cirrospilus esurus Riley, 1879. Canad. Ent. 11:162. Comstock, 1879. Report upon Cotton Insects, p. 195. Riley, 1880. U. S. Ent. Comm. Bul 3:43.

Tetrastichus esurus (Riley) Riley, 1885. U. S. Dept. Agr., Fourth Rpt. U. S. Ent. Comm., p. 115, [111].

Syntomosphyrum esurus (Riley) Howard, 1897. U. S. Dept. Agr., Div. Ent. Tech. Ser. 5:38. Marlatt, 1902. U. S. Dept. Agr., Div. Ent. Bul. 37:86. Marlatt, 1903. Ent. Soc. Washington Proc. 5:138. Howard and Fiske, 1911. U. S. Dept. Agr., Bur. Ent. Bul. 91:139, 144. Viereck, 1917. Conn. State Geol. and Nat. Hist. Survey Bul. 22:452. Britton, 1918. Conn. Agr. Expt. Sta. Bul. 203:323. Ruhl, 1921. Soc. Ent. 36:11. Stellwaag, 1921. Monog. angew. Ent. 6:89, 91. Bott, 1926. Jour. Agr. Res. 33:800. Driggers, 1929. N. Y. Ent. Soc. Jour. 37:169. Haeussler, 1930. Jour. Agr. Res. 41:367. Roney, 1930. Jour. Econ. Ent. 23:286. Driggers, 1931. N. J. State Expt. Sta., Dept. Ent. Rpt. 1929-1930, p. 159. Frost, 1931. Jour. Econ. Ent. 24:1213. Clarke, 1933. Georgia Office of State Ent. Bul. 77:30. Nettles, 1934. Jour. Econ. Ent. 27:815. Creighton, 1936. Jour. Econ. Ent. 29:93, 282. Schedl, 1936. Monog. angew. Ent. 12:193. Swain, 1937. Ent. News 48:246. Brimley, 1938. Insects of N. Car., p. 512. Gahan, 1951. Canad. Ent. 83:171.

Syntomosphyrum esurum (Riley) Howard, 1903. Ent. Soc. Washington Proc. 5:139.

Syntomosphyrum orgyriæ Ashmead, 1894. Amer. Ent. Soc. Trans. 21:343. Viereck, 1917. Conn. State Geol. and Nat. Hist. Survey Bul. 22:452. Ruhl, 1921. Soc. Ent. 36:11. Britton, 1937. Conn. Agr. Expt. Sta. Bul. 396:309. [Synonymized with *esurus* Riley by Howard, 1897.]

Female.—Length of body 1.2-1.6 mm. Color black; antennal scape black, pedicel dark brown with apex tan, flagellum brown dorsally, tan ventrally; coxae black, trochanters tan or yellow, femora dark brown with yellow apices, tibiae yellow with median area of each usually slightly darkened, tarsi yellow.

Apex of scape not quite reaching level of ventral margin of anterior ocellus; relative lengths of parts of antenna—scape, 7; pedicel, 3; first funicle segment, 2.5; second, 2; third, 2; club, 5. Mesoscutum with one and a partial second rows of bristles at each lateral margin; marginal vein of fore wing three times as long as stigmal vein; submarginal vein bearing 4-6 dorsal bristles; median length of postscutellum one-half as great as that of propodeum. Surface of propodeum shagreened, median carina strongly developed; apex of ovipositor not quite reaching apex of abdomen.

Male.—Length of body 1.0-1.2 mm. Antennal scape bearing an anteriorly projecting flange on apical four-fifths, funicle segments enlarged near bases and bearing conspicuously long bristles, relative lengths of parts of antenna—scape, 6; pedicel, 2; first funicle segment, 1.5; second, 2; third, 2; fourth, 2; club, 7.

Type locality.—Selma, Ala.

Types.—U. S. N. M no. 2793.

Distribution.—Eastern States and southeastern Canadian Provinces west to Texas, Kansas, and Manitoba.

Hosts.—Pupae of Lepidoptera: Cotton leafworm, *Alabama argillacea* (Hübner); *Anomis erosa* Hübner; walnut leaf crumpler, *Acrobasis juglandis* (LeBaron); spruce budworm, *Choristoneura fumiferana* (Clemens); sugarcane borer, *Diatraea saccharalis* (Fabricius); Oriental fruit moth, *Grapholitha molesta* (Busek); pecan bud moth, *Gretchnia bolliana* (Slingerlund); white-marked tussock moth, *Hemerocampa leucostigma* (J. E. Smith); fall webworm, *Hyphantria cunea* (Drury); forest tent caterpillar, *Malacosoma disstria* Hübner; brown-tail moth, *Nygmia phaeorrhoea* (Donovan); gypsy moth, *Porthetria dispar* (Linnaeus); *Stenomoma algidella* (Walker).

Syntomosphyrum philodromi (Gahan)

Tetrastichus philodromi Gahan, 1924. U. S. Natl. Mus. Proc. 64 (4):18.

Auten, 1925. Ent. Soc. Amer. Ann. 18:242.

Syntomosphyrum philodromi (Gahan) Peck in Muesebeck and others, 1951. U. S. Dept. Agr. Monog. 2, p. 451.

Female.—Length of body 1.0-1.1 mm. Color black, with faint iridescent luster; antenna light yellow, dorsal sides of scape and pedicel slightly darkened; coxae and basal four-fifths of each femur dark brown, trochanters, apices of femora, tibiae, and tarsi white or light yellow.

Apex of scape not reaching level of ventral margin of anterior ocellus; relative lengths of parts of antenna—scape, 8; pedicel, 4; first funicle segment, 3; second, 3; third, 3; club, 8. Mesoscutum broader than long and bearing two and a partial third rows of bristles at each lateral margin; marginal vein of fore wing two and one-half times as long as stigmal; submarginal vein bearing 2-4 dorsal bristles; length of mesoscutellum five times as great as length of postscutellum, and propodeum one and one-half times as long as postscutellum. Surface of propodeum smooth, median carina wanting; apex of ovipositor reaching or very slightly exceeding apex of abdomen.

Male.—Length of body 1.0 mm. Antennal scape bearing a darkened, anteriorly projecting flange on apical four-fifths; funicle segments semi-quadrate, lacking long bristles; relative lengths of parts of antenna—scape, 8; pedicel, 4; first funicle segment, 2; second, 2; third, 2; fourth, 2; club, 6.

Type locality.—South Bass Island, Ohio.

Types.—U. S. N. M. no. 26182

Distribution.—Ohio.

Host.—Egg sac of spider, *Philodromus canadensis* Emerton.

Syntomosphyrum prionomeri (Girault)

Tetrastichopsis prionomeri Girault, 1916. U. S. Natl. Mus. Proc. 51:132.

Syntomosphyrum prionomeri (Girault) Peck in Muesebeck and others, 1951. U. S. Dept. Agr. Monog. 2, p. 452.

Female.—Length of body 1.1-1.2 mm. Color very dark brown with faint, metallic blue luster; antennal scape and pedicel dark brown with apex of each yellow, flagellum light brown, with bristles yellow; coxae and basal four-fifths of each femur dark brown, trochanters light brown, apices of femora, entire tibiae, and basal three segments of each tarsus yellow, apical segment of each tarsus brown.

Apex of antennal scape not reaching level of ventral margin of anterior ocellus; relative lengths of parts of antenna—scape, 10; pedicel, 4; first funicle segment, 3; second, 3; third, 3; club, 8. Mesoscutum as long as broad and bearing a single row of bristles at each lateral margin; marginal vein of fore wing two and one-half times as long as stigmal; submarginal vein bearing 2-3 dorsal bristles; median lengths of propodeum and postscutellum equal. Surface of propodeum smooth, median carina weak; apex of ovipositor just reaching apex of abdomen.

Male.—Unknown.

Type locality.—Clarksville, Tenn.

Types.—U. S. N. M. no. 19649.

Distribution.—Tennessee.

Host.—Leaf-mining curculionid *Odontopus* (= *Prionomerus*) *calceatus* Say.

***Syntomosphyrum blattae*, new species**

Female.—Length 0.8-1.5 mm. Head and body very dark brown to black, shining but non-metallic; antennal scape yellow, pedicel and flagellum light brown; coxae and hind femora dark brown, trochanters yellow, fore and mid femora tan, tibiae and tarsi yellow, with apical segment of each fore tarsus brown.

Antennae inserted at level of ventral margins of compound eyes, apices of scapes not quite reaching level of ventral margin of anterior ocellus; length of malar space two-thirds as great as height of compound eye; ocellular and postocellar lines equal in length; relative lengths of parts of antenna—scape, 10; pedicel, 6; first funicle segment, 4; second, 4; third, 4; club, 8. Mesoscutum as wide as long and bearing one row of bristles at each lateral margin; submarginal vein of fore wing bearing 3-5 dorsal bristles; marginal vein four times as long as stigmal; median lengths of propodeum and postscutellum equal. Surface of propodeum smooth, median carina obscure, virtually wanting, lateral carinae wanting, propodeal spiracle round, its diameter twice as great as width of space separating it from anterior propodeal margin; gaster as long as thorax and propodeum combined; apex of ovipositor not quite reaching apex of gaster.

Male.—Length 1.0-1.2 mm. Similar to female except as follows: Antennal scape yellow, apical three-fifths bearing a darkened, anteriorly projecting flange; relative lengths of parts of antenna—scape, 10; pedicel, 6; first funicle segment, 3; second, 3; third, 4; fourth, 4; club, 10;

funicle segments enlarged near bases and bearing conspicuously long bristles; gaster slightly shorter than thorax and propodeum combined.

Type locality.—Morgantown, W. Va.

Types.—U. S. N. M. no. 61310.

Described from 33 male and 239 female specimens as follows: Female holotype, male allotype, and 8 female and 1 male paratypes from the type locality, May 15, 1931, reared from roach eggs, L. M. Peairs; 2 female paratypes, Durham, N. C., 1940, A. S. Pearse; 228 female and 31 male paratypes, High Bank, Ohio, May-June 1951, reared from oothecae of woods roach, *Parcoblatta* sp., L. R. Edmunds. Six hundred sixty additional specimens, not included in the type series, were reared by Mr. Edmunds from *Parcoblatta* oothecae collected at High Bank and University Woods, Ohio, May-June 1951.

BOOK REVIEW

FOREST ENTOMOLOGY, by Samuel Alexander Graham, University of Michigan. [American Forestry Series.] Third ed., 8 vo., cloth, 334 pp., 85 illus., N. Y., McGraw-Hill Book Company, 1952, \$6.00.

The enormous advances made in recent years in the use of the newer insecticides in control of forest insects is much more keenly realized when a revision such as this appears, in which accounts are given of such progress. A page by page checking of the sections pertaining to insecticides in the second edition of this work, issued in 1939, with this third edition reveals that the changes have been so great and progress has been so rapid recently that the author has had to rewrite those portions of the book. As would be expected, considerable attention is given to the present status of the investigations with various compounds of DDT, benzene hexachloride, toxaphene, chlorinated camphene, chlordane, and the like. The advent of these highly effective insecticides has brought about changes in methods of application, particularly from the air. Instead of dusting, the materials more often are now used in oil solutions or emulsions. This has made possible the present-day large scale control operations that would have been impossible in 1929 when the first edition of this book appeared. New chapters also have been added, in this third edition, describing latest methods of making forest insect surveys as well as new procedures in detecting and appraising damage. In the remainder of the book there prevails the same high standards of scholarship as in previous editions.—J. S. WADE, *Washington, D. C.*